

PROBLEMS OF MODERN PLANT
PHYSIOLOGY.

Pflanzenphysiologie. By Prof. W. Palladin. Pp. vi+310. (Berlin: Julius Springer, 1911.) Price 8 marks.

EVERYONE who is interested in the problems of plant physiology will accord a welcome to Prof. Palladin's book, which in a German form represents the sixth Russian edition, and therefore may be taken as a matured expression of its author's point of view. Those who are conversant with Prof. Palladin's work will naturally expect to find the chemical aspects of the science, or rather certain portions of it, more fully presented than is often the case in works of this dimension, nor will they be disappointed. Nevertheless, the book does not belong to the category of abstruse manuals; it is eminently readable, and even contains several good stories of the great men of the past. One of these is worth relating. Bous-singault, when engaged on investigations on the gaseous exchange of plants, had aroused considerable interest amongst his colleagues both on account of the actual results obtained and of the accurate methods of analysis he employed. Suddenly, however, the readings of the experiments began to give contradictory and unexpected values for the amounts of carbon dioxide present, notwithstanding that the conditions of the experiments apparently remained unchanged. Bous-singault and his collaborator were hopelessly at a loss to explain the results obtained, when they happened to meet Regnault, who laughed at their long faces, and asked what was the matter. To their complaints he replied that he had been doubtful whether their means of investigation were really as delicate as they had claimed, and that in order to test them he himself had gone and breathed into their apparatus for several mornings while they were at breakfast!

The book is divided into two parts of very unequal value. The first, which is the longer, as it is also the better, is devoted to the metabolic processes; the second and shorter part contains a rather brief, but still not uninteresting, sketch of irritability and other "living" questions. In dealing with metabolism, the chemico-physical aspect is kept well to the front, though it is a little curious to find, on an earlier page, that emphasis is laid rather on the mysterious, than on the physical, attributes of heredity. Heredity, regarded from the general point of view adopted in this part of the book, is thus somewhat opposed to the attitude generally maintained with regard to other topics. It might, however, perhaps be argued that, from a chemical point of view, heredity

implies that the course of chemical change in a group of really related forms should run along similar lines, as the natural outcome and expression of a fundamentally similar physical structure. We should anticipate resemblances among related organisms if their forms and functional attributes really depend on physical qualities and the serial reactions which are conditioned by them.

The book is very suggestive and is really full of interesting matter, but it is too short, and thus the treatment of many of the problems is far too much curtailed. Furthermore, one misses at times an adequate reference to modern work, particularly that of British writers. The treatment of photosynthesis and of the ascent of sap may serve to illustrate what is here meant. In the latter connection no mention appears to be made of Dixon and Joly's work, and this although a fair account of it has already been printed in German. The author's meaning is sometimes a little obscure, but this is perhaps due to the difficulty of a foreign edition. It is certainly not a legitimate inference from Timiriazeff's well-known experiments to allege that the same rays of light which split up carbon dioxide can be held to be responsible for the formation of starch (p. 32). The latter process depends upon the concentration of the sugar and sundry other factors, but its occurrence only stands in indirect relation to the source of light. The omission of any reference to the excellent work done at Rothamsted on soil problems is also regrettable, inasmuch as avenues of further work have been thereby opened up which will certainly lead to results of the highest importance in connection with plant nutrition.

The discussion of the essentials of fermentation is both useful and stimulating in a field which is being so assiduously cultivated. The successional action of ferments commonly to be observed in certain organisms is attributed to the corresponding withdrawal of the inhibiting agency of anti-ferments or "anti-kinases."

It is, perhaps, becoming difficult for some of us to resist the impression that there must be some underlying and simplifying principle still to be sought in connection with these rapidly multiplying ferments. At the present time, however, it is rather the fashion to postulate the existence of a separate and specific ferment to account for almost every different reaction that goes on in the body. But it should not be forgotten that nobody has ever isolated a pure ferment, and one is inclined to inquire whether the evidence for their separate individuality is really conclusive, or whether the reactions from which their existence is inferred may not depend after all on the protean diversity of structural aggregation and organisa-

tion of albuminous substances relatively simple and few in number.

We can honestly say that Prof. Palladin has well earned the gratitude of a wide circle of colleagues by rendering his book more generally accessible than heretofore. Not only the botanist and physiologist, but many others who are interested in the working of living organisms will find much that is suggestive in its pages, in which the endeavour is made "die komplizierten Lebenserscheinungen in einfache zu zerlegen und sie schliesslich auf Gesetze der Chemie und der Physik zurückzuführen."

J. B. F.

PROTOZOLOGY.

Lehrbuch der Protozoenkunde. Eine Darstellung der Naturgeschichte der Protozoen mit besonderer Berücksichtigung der parasitischen und pathogenen Formen. By Prof. Doflein. Dritte Auflage. Pp. xii+1043. (Jena: Gustav Fischer, 1911.) Price 26 marks (unbound).

THE extent to which the Protozoa are absorbing the attention of scientific investigators at the present time cannot be better illustrated than by the fact that the second and greatly enlarged edition of Prof. Doflein's treatise on the Protozoa, which appeared towards the end of 1909 (reviewed in NATURE, No. 2105, vol. lxxxiii, March 3, 1910), passed out of print within a year of its publication, and now a third edition of the work is before us. The book has undergone thorough revision in every part, and is increased substantially in size to 1043 pages and 951 figures as against 914 pages and 825 figures in the second edition.

In the general part the most noteworthy changes are the discussions of autogamy and of Hartmann's theory of polyenergid nuclei, and an additional section of eight pages dealing with spontaneous generation, the conception of species, variation and heredity in Protozoa. An error must be pointed out on p. 294, where it is stated that "while *Trypanosoma brucei* and *T. lewisi* can be cultivated in dogs side by side, *T. brucei* disappears and *T. lewisi* alone reproduces itself when rats are injected with this blood." It is well known that *T. lewisi* will not reproduce itself in the blood of the dog in any circumstances; the reference is to certain experiments of Koch, who showed that *T. brucei* and *T. lewisi* would live side by side in the blood of the same rat, but that if a dog was injected with the blood of that rat, *T. lewisi* disappeared and *T. brucei* alone persisted. The author has stated the facts quite correctly in another of his works ("Probleme der Protistenkunde," i., Jena, 1909, p. 33).

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whence it is evident that the misstatement is merely a clerical error, but nevertheless it is exceedingly misleading as it stands.

In the special part of the book the section on spirochaetes has been revised, with the addition of new figures after Gross, Margarete (not Margarine!) Zuelzer, and others. No mention is made, however, of the developmental facts made known by Leishman in January, 1910, and now confirmed abundantly, namely, the formation of so-called coccoid bodies or spores. Possibly a consideration of these facts might have led the author to recognise that the evidence for the bacterial affinities of the spirochaetes far outweighs any indication of relationship to Protozoa afforded by similarity in reactions to therapeutic agents. The section dealing with the trypanosomes has also undergone many changes, and extensive revisions and additions are made in the account given of the parasitic amoebæ, especially in the description of the dysenteric amoeba (*Entamoeba histolytica*).

The illustrations of the book are its great feature, and the new edition contains, like the last, advance figures from investigations not yet published. Many of the figures of the preceding edition have been cut out; we think the pruning might have been carried further with advantage in some cases. Fig. 219, showing spore-formation in *Myxosporidia*, is quite out of date, and is in contradiction to other figures in the book. Figs. 363 and 367, illustrating trypanosomes, are scarcely worthy of a place in a modern text-book. The cultural development of *Leishmania* might have been illustrated better than by Figs. 401 and 404. Fig. 707 is very poor, and Fig. 877, a new figure, has not been reproduced successfully.

Taken as a whole, however, the value and usefulness of the book is greatly augmented, and it is well worth the slight increase of price over the former edition. As a treatise on the Protozoa it is a monumental production, with which no other can compare that has appeared since the 'eighties.

E. A. M.

MODERN EXPLOSIVES.

Historical Papers on Modern Explosives. By George W. MacDonald. With an introduction by Sir Andrew Noble, Bart., K.C.B., F.R.S. Pp. xi+192. (London: Whittaker and Co., 1912.) Price 7s. 6d. net.

ACCESS to the literature of the early part and middle of the last century in connection with a subject which has become a great industry in modern times is possible, as a general rule, only to a limited number of those whose lot it is to